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United States
Department of
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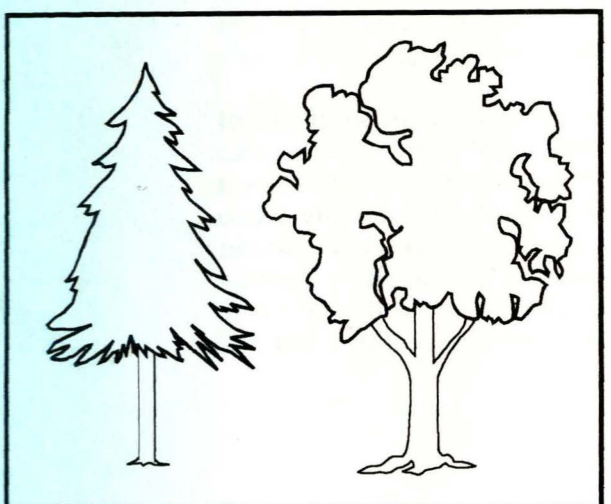
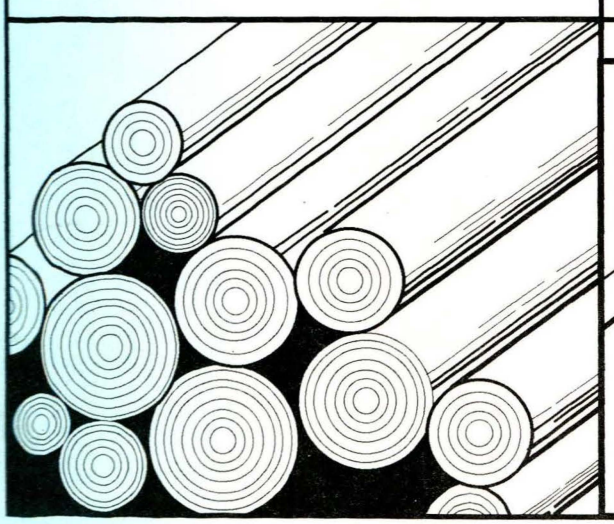
North Central
Forest Experiment
Station

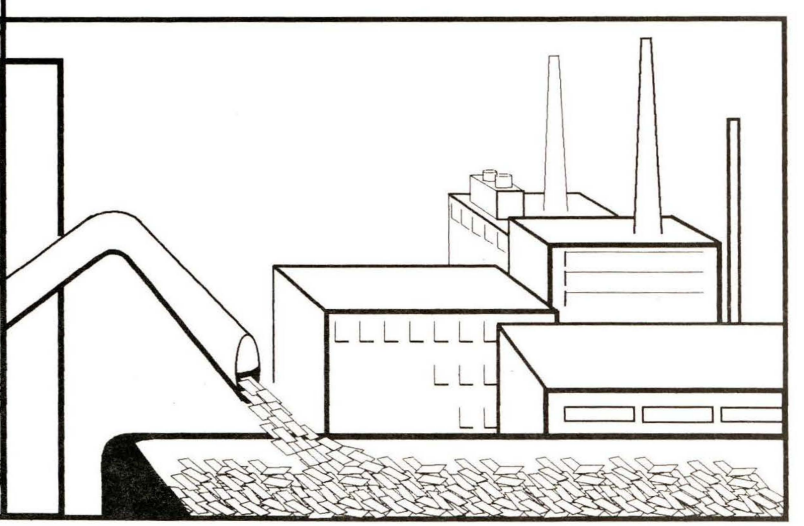
Resource Bulletin
NC - 175

South Dakota Timber Industry - An Assessment of Timber Product Output and Use, 1993

Ronald L. Hackett and Raymond A. Sowers







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1992 Folwell Avenue
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Manuscript approved for publication October 4, 1996
1996

FOREWORD

This bulletin reports findings of a survey of all primary wood-using mills in South Dakota in 1993 and details the industry's size and composition, its use of roundwood, and its generation and disposition of wood residues. Such detailed information is necessary for intelligent planning and decisionmaking in wood procurement, forest resource management, forest industry development, and forest research.

Special thanks are given to primary wood-using firms that responded to the survey and to the South Dakota Department of Agriculture for canvassing the respondents. Their cooperation is greatly appreciated.

In this bulletin, all volumes are reported in product-specific standard units and/or cubic feet. When necessary, volumes reported by mills in nonstandard units were converted to standard units using regional conversion factors. Reported trends and changes in South Dakota's primary wood-using industry are based on comparisons with previous surveys of the State's primary wood-using industry conducted in 1983 and 1964. Row and column data of tables may not sum due to rounding, but data in each table cell are accurately displayed.

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South Dakota Timber Industry—An Assessment of Timber Product Output and Use, 1993

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HIGHLIGHTS

PRIMARY WOOD-USING INDUSTRY

- South Dakota's primary wood-using industry is comprised of 18 mills: 12 sawmills and 6 post and pole, log cabin manufacturers, or pulp mills (table 1 and fig. 1). Most of the mills—13—are located in the Black Hills area.
- In 1993, all the primary wood-using mills in South Dakota processed a total of 14.3 million cubic feet of roundwood into lumber and other various products (table 2).

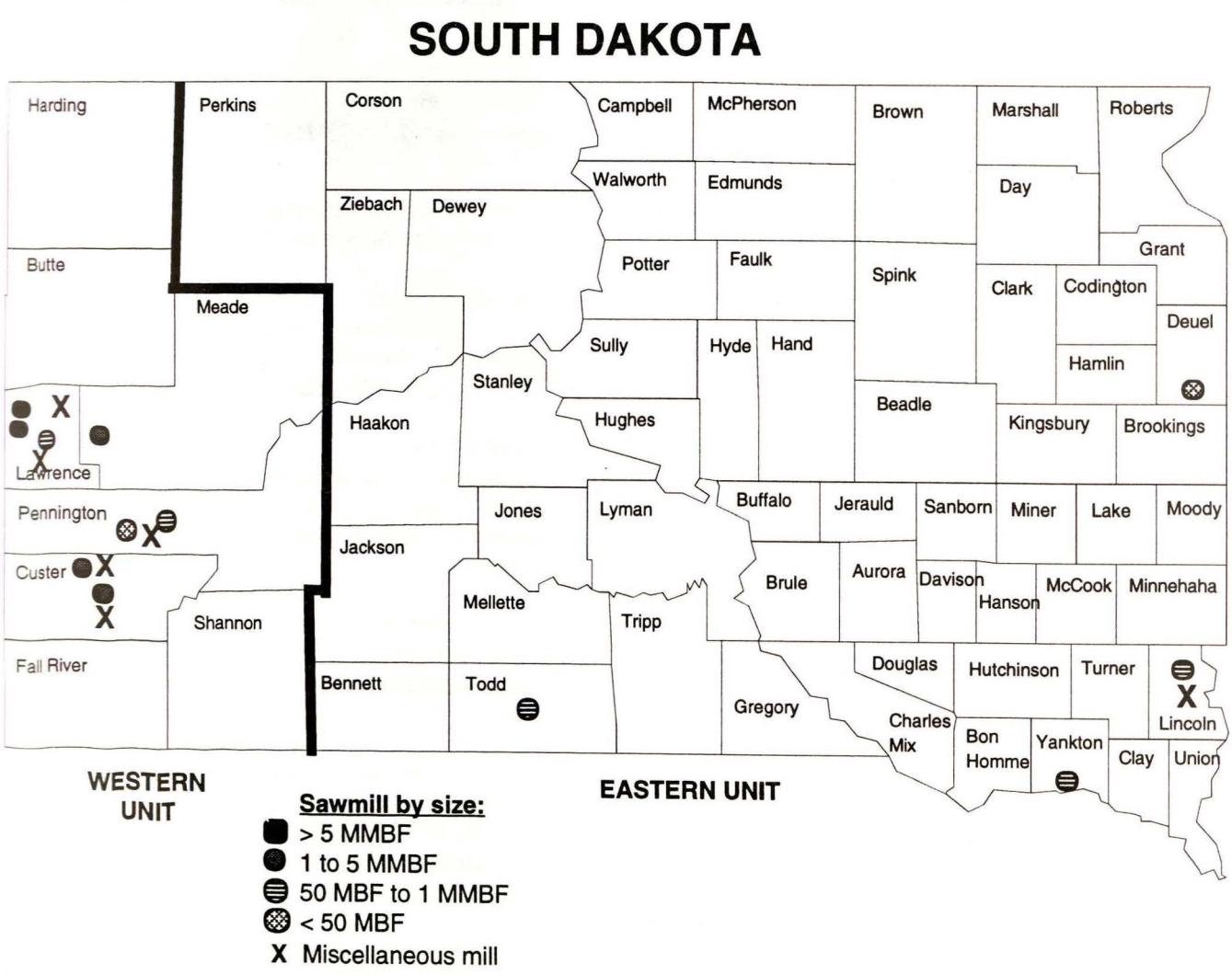

Figure 1.—*Forest Survey Units and wood-using mills in South Dakota, 1993.*

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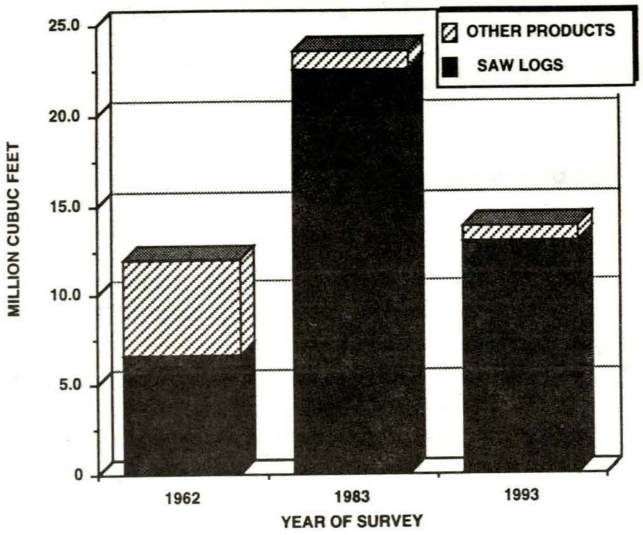

Figure 2.—*Industrial roundwood production by product, South Dakota, 1962-1993.*

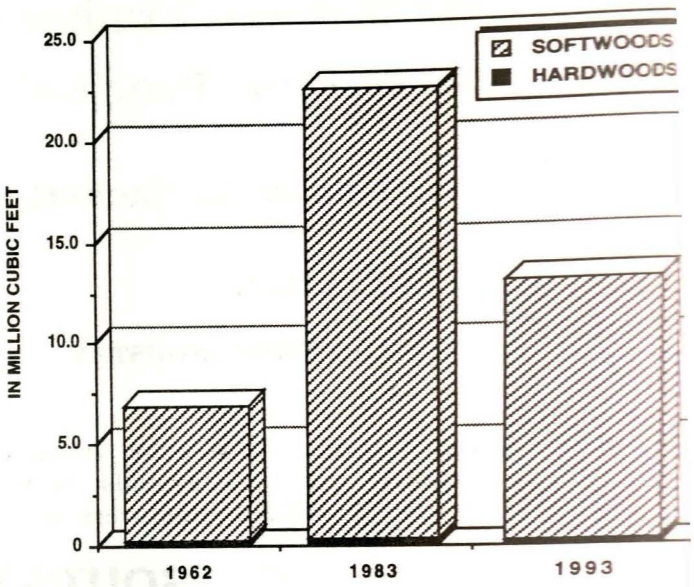

Figure 3.—*Saw-log production by species group, South Dakota, 1962-1993.*

- Except for small amounts of various species of roundwood (mainly ponderosa pine), imported from neighboring States, more than 60 percent of the roundwood processed was cut from South Dakota's forest lands.

INDUSTRIAL ROUNDWOOD PRODUCTION

- In 1993, nearly 13.8 million cubic feet of industrial roundwood products were cut from South Dakota's forest lands, about half that cut in 1983, and about the same as or slightly more than that cut in 1962 (table 3 and fig. 2).

- Saw logs continued to be the main form of industrial roundwood harvested from South Dakota's forest. The only other roundwood products cut in 1993 were post, poles, cabin logs, and pulp. The major species for these products were ponderosa pine and cottonwood.

- After increasing greatly from 1962 to 1983, saw-log production in South Dakota in 1993 declined to just about half the amount produced in 1983—more than 79 million board feet (table 4 and fig. 3).

- Since 1983, saw-log production in South Dakota has declined 43 percent; all the decline has occurred in softwood species.

- Ponderosa pine accounted for 98 percent of all saw logs harvested in 1993.

- In 1993, South Dakota sawmills processed about 62 percent of the saw logs harvested in the State; the remaining logs were exported to Wyoming and Nebraska.

- Most of the saw-log production in 1993 occurred in the Western Survey Unit in and around the counties that contain most of the sawmills and other primary wood-using mills (table 5).

- Three counties—Custer, Lawrence, and Pennington—accounted for more than 87 percent of all the saw logs produced in the State.

- Sawmills in South Dakota received more than 32 million board feet of saw logs from other States—Wyoming, Nebraska, and Montana. The principal species imported was ponderosa pine with 32 million board feet (table 6).

- A small amount of cottonwood was imported from Iowa and Nebraska.

TIMBER REMOVALS FOR INDUSTRIAL ROUNDWOOD

- In the harvest of industrial roundwood in 1993, nearly 19 million cubic feet of timber was cut. Only 26 percent or just over 5 million cubic feet was left in the woods as harvest residues (tables 7, 8 and fig. 4).

- Nearly 75 percent of the woody material removed in 1993 was harvested from growing-stock sources (sawtimber, poletimber, and harvest residues).

- Timber harvested for industrial roundwood and the resulting generation of logging residues extracted 14.5 million cubic feet of

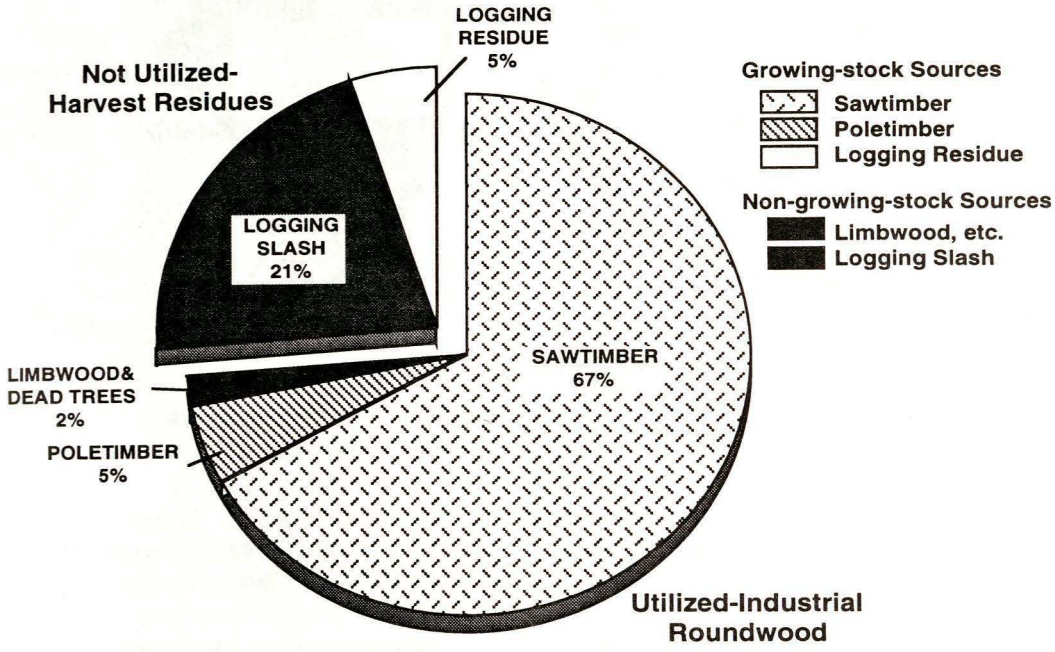

Figure 4.—*Distribution of timber removals for industrial roundwood by source of material, South Dakota, 1993.*

- Harvest residues included 1 million cubic feet of growing-stock portions of live trees on timberland (logging residues) and 4 million cubic feet of tops and cull material (logging slash).

- South Dakota was dominated by sawmills in 1993; removals for sawtimber supplied most of the volume for industrial roundwood products. Some product volume was extracted from poletimber and non-growing-stock sources such as limbwood, cull trees, dead trees, and nonforest trees from city parks, etc.

growing-stock volume from South Dakota's timberland inventory in 1993 (table 9). In board foot equivalents, 80 million board feet of the total was cut from the sawtimber portion of the growing-stock inventory (table 10).

PRIMARY MILL RESIDUES

- During 1993, South Dakota's primary wood-using mills generated nearly 110 thousand tons of coarse (chippable) wood residue, 43 thousand tons of fine residue, and 50 thousand tons of bark (table 11).

- More than half of this volume was in the form of coarse wood residue, such as slabs and edgings, which is suitable for chipping (fig. 5).

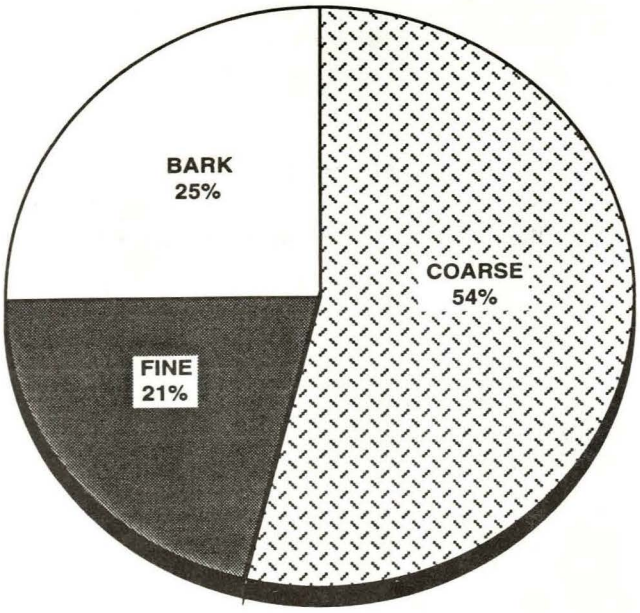

Figure 5.—*Distribution of residues generated by primary wood-using mills by type of residue, South Dakota, 1993.*

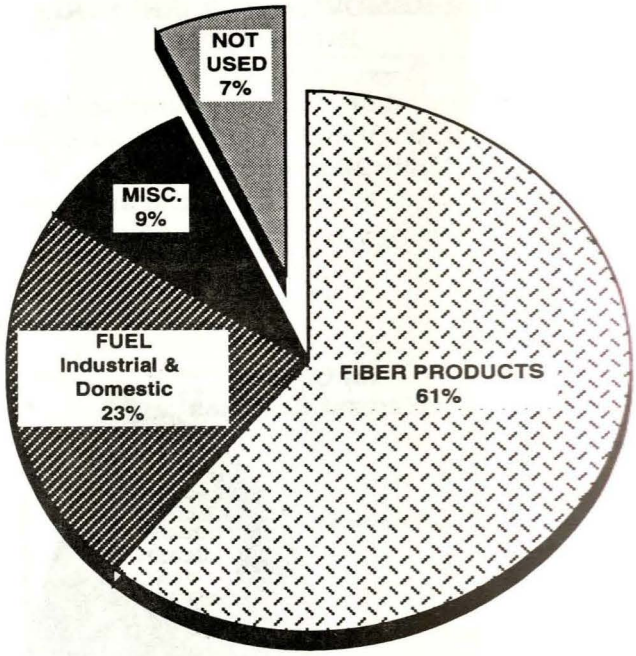

Figure 6.— *Distribution of residues generated by primary wood-using mills by method of disposal, South Dakota, 1993.*

- Ninety-three percent or more of all residues (coarse, fine, bark) generated at South Dakota primary mills was used (fig. 6).

- The bulk of the coarse and fine wood residues, such as slabs, edgings, shavings, and sawdust, was used for fiber products such as particleboard. The remaining coarse and fine residues were used for fuel, fuel pellets, mulch, and livestock bedding.

- However, 7 percent of the mill residues generated in the State still remained unused, but this was less than in 1983.

APPENDIX

STUDY METHODS

This study was a cooperative effort of the South Dakota Department of Agriculture (SDDA) and the North Central Forest Experiment Station (NCFES). Using mail questionnaires supplied by NCFES and designed to determine the size and composition of the State's primary wood-using industry, its use of roundwood, and its generation and disposition of wood residues, the SDDA canvassed all primary wood-using mills within the State. Followups to nonresponding mills using additional mailings, telephone, and personal contacts were made by SDDA until a 100-percent response was achieved. Completed questionnaires were sent to NCFES for editing and processing.

As part of data editing and processing, all industrial roundwood volumes reported on the questionnaires were converted to standard units of measure using regional conversion factors. Timber removals by source of material and harvest residues generated during logging were

estimated from standard product volumes using factors developed from logging utilization studies previously conducted by NCFES. Finalized data on South Dakota's industrial roundwood receipts were loaded into a regional timber removals database where they were supplemented with data on out-of-State uses of South Dakota roundwood to provide a complete assessment of South Dakota's timber product output.

DEFINITION OF TERMS

Board foot.—Unit of measure applied to roundwood. It relates to lumber that is 1 foot long, 1 foot wide, and 1 inch thick (or its equivalent).

Central stem.—The portion of a tree between a 1-foot stump and the minimum 4.0-inch top diameter outside bark or point where the central stem breaks into limbs.

Coarse mill residue.—Wood residue suitable for chipping such as slabs, edgings, and veneer cores.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

Cull removals.—Net volume of rough and rotten trees plus the net volume in sections of the central stem of growing-stock trees that do not meet regional merchantability standards, harvested for industrial roundwood products.

Dead removals.—Net volume of dead trees harvested for industrial roundwood products.

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Fine mill residue.—Wood residue not suitable for chipping such as sawdust and veneer clippings.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide.

Growing-stock removals.—The growing-stock volume removed from the timberland inventory by harvesting industrial roundwood products. (Note: Includes sawtimber removals, poletimber removals, and logging residues.)

Growing-stock tree.—A live timberland tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Harvest residues.—The total net volume of unused portions of trees cut or killed by logging. (Note: Includes both logging residues and logging slash.)

Industrial fuelwood.—A roundwood product with or without bark, used to generate energy at non-manufacturing facilities such as schools, correctional institutions, or electric generating plants.

Industrial roundwood products.—Saw logs, pulpwood, veneer logs, poles, commercial posts, piling, cooperage logs, particleboard bolts, shaving bolts, lath bolts, charcoal bolts, and chips from roundwood used for pulp or board products.

Industrial roundwood production.—The quantity of industrial roundwood harvested in a geographic area.

Industrial roundwood receipts.—The quantity of industrial roundwood received by commercial mills in a geographic area.

International 1/4-inch rule.—A log rule or formula for estimating the board foot volume of logs, allowing one-half inch of taper for each 4-foot length. The rule appears in a number of forms that allow for kerf. In this form, one-quarter inch of kerf is assumed. This rule is used as the USDA Forest Service standard log rule in the Eastern United States.

Limbwood removals.—Net volume of all portions of a tree other than the central stem, (including forks, large limbs, tops, and stumps) harvested for industrial roundwood products.

Logging residue.—The net volume of unused portions of the merchantable central stem of growing-stock trees cut or killed by logging.

Logging slash.—The net volume of unused portions of the unmerchantable (non-growing-stock) sections of trees cut or killed by logging.

erchantable sections.—Sections of the central stem of growing-stock trees that meet either pulpwood or saw-log specifications.·

Net volume.—Gross volume less deductions for rot, sweep, or other defects affecting use for roundwood products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial roundwood products. Classified in volume tables as rough trees.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 39.9-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, improved roads and nonforest strips must be more than 120 feet wide and more than 1 acre to qualify as nonforest land.)

Nonforest land removals.—Net volume of trees on nonforest lands harvested for industrial roundwood products.

Poletimber.—A growing-stock tree at least 5.0 inches d.b.h. but smaller than sawtimber size (9.0 inches d.b.h. for softwoods, 11.0 inches d.b.h. for hardwoods).

Poletimber removals.—Net volume in the merchantable central stem of poletimber trees harvested for industrial roundwood products.

Primary wood-using mills.—Mills receiving roundwood or chips from roundwood for processing into products such as lumber, veneer, and pulp.

Primary wood-using mill residue.—Wood materials (coarse and fine) and bark generated at manufacturing plants from roundwood processed into principal products. These residues include wood products (byproducts) obtained incidental to production of principal products and wood materials not utilized for some product.

Rotten tree.—A tree that does not meet regional merchantability standards because of excessive unsound cull.

Rough tree.—A tree that does not meet regional merchantability standards because of excessive sound cull. Includes noncommercial tree species.

Roundwood.—Logs, bolts, or other round sections cut from trees (including chips from roundwood).

Sapling.—A live tree between 1.0 and 5.0 inches d.b.h.

Sapling removals.—Net volume in saplings harvested for industrial roundwood products.

Saw-log portion.—That portion of the central stem of sawtimber trees between the stump and the saw-log top.

Saw-log top.—The point on the central stem of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber removals.—As used in table 7, sawtimber removals refers to the net volume in the merchantable central stem of sawtimber trees harvested for industrial roundwood products. (Note: Includes the saw-log and upper-stem portions of sawtimber trees.) When referring to the sawtimber volume removed from the timberland inventory as in table 10, sawtimber removals refers to the net volume in the saw-log portion of sawtimber trees harvested for roundwood products or left on the ground as harvest residue, and is usually expressed in thousands of board feet (International 1/4-inch rule).

Sawtimber tree.—A growing-stock tree containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h., and hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume in the saw-log portion of sawtimber trees.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Timber product output.—The volume of roundwood products produced from an area's forests.

Timberland.—Forest land that is producing, or is capable of producing, in excess of 20 cubic feet per acre per year of industrial roundwood products under natural conditions, is not withdrawn from timber utilization by statute or administrative regulation, and is not associated with urban or rural development.

Tree.—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

Upper stem portion.—That portion of the central stem of sawtimber trees between the saw-log top and the minimum top diameter of 4.0 inches outside bark or the point where the central stem breaks into limbs.

Veneer log.—Log to be used in the production of plywood, finished panels, or veneer sheets, both rotary cut and sliced.

COMMON AND SCIENTIFIC NAMES OF TREE SPECIES MENTIONED IN THIS REPORT

SOFTWOODS

Ponderosa pine ..... *Pinus ponderosa*
Western white pine ..... *Pinus monticola*
Lodgepole pine ..... *Pinus contorta*
Western larch ..... *Larix occidentalis*
Spruce
  White spruce ..... *Picea glauca*
  Englemann spruce ..... *Picea engelmannii*
Eastern redcedar ..... *Juniperus virginiana*

HARDWOODS

Ash
  Black ash ..... *Fraxinus nigra*
  Green ash ..... *Fraxinus pennsylvanica*
Cottonwood
  Eastern cottonwood ..... *Populus deltoides*
  Plains cottonwood ..... *Populus sargentii*
Elm
  American elm ..... *Ulmus americana*
  Slippery elm ..... *Ulmus rubra*

TABLE TITLES

Table 1.—Number of active primary wood-using mills in South Dakota, 1993

Table 2.—Industrial roundwood receipts by species group and State of origin, South Dakota, 1993

Table 3.—Industrial roundwood production by Forest Survey Unit, species group, and type of product, South Dakota, 1993

Table 4.—Saw-log production by Forest Survey Unit, species group, and State of destination, South Dakota, 1993

Table 5.—Saw-log production by Forest Survey Unit, county, and species group, South Dakota, 1993

Table 6.—Saw-log receipts by Forest Survey Unit, species group, and State of origin, South Dakota, 1993

Table 7.—Timber removals for industrial roundwood by source of material and species group, South Dakota, 1993

Table 8.—Harvest residue generated by industrial roundwood harvesting by Forest Survey Unit, county, and species group, South Dakota, 1993

Table 9.—Growing-stock removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, South Dakota, 1993

Table 10.—Sawtimber removals from timberland for industrial roundwood production by Forest Survey Unit, county, and species group, South Dakota, 1993

Table 11.—Residues produced at primary wood-using mills by type of material, type of use, and Forest Survey Unit, South Dakota, 1993

Table 1.—Number of active primary wood-using mills in South Dakota, 1993

Kind of mill	Number of mills
Sawmills	
Greater than 5,000 mbf 1/	2
1,000 to 5,000 mbf 1/	3
50 to 1,000 mbf 1/	5
Less than 50 mbf 1/	2
Total	12
Other mills	6
Total	18

1/ Thousand board feet of lumber per year, International 1/4-inch rule.

Table 2.—Industrial roundwood receipts by species group and State of origin, South Dakota, 1993

(In thousand cubic feet)

Species group	Total	Iowa	Nebraska	South Dakota	Wyoming	Montana	Canada
SOFTWOODS							
Redcedar	4	--	--	4	--	--	--
Spruce	25	--	--	25	--	--	--
Ponderosa pine	14,049	--	1,876	8,786	2,705	683	--
Western larch	8	--	--	--	--	8	--
Lodgepole pine	170	--	--	--	93	77	--
W. white pine	1	--	--	--	--	1	--
Engelmann spruce	10	--	--	--	--	--	10
Total	14,267	--	1,876	8,814	2,798	769	10
HARDWOODS							
Ash	2	--	--	2	--	--	--
Cottonwood	64	11	8	46	--	--	--
Elm	6	--	--	6	--	--	--
Total	72	11	8	54	--	--	--
All species	14,339	11	1,884	8,868	2,798	769	10

Rows and columns may not sum due to rounding.

Table 3.—Industrial roundwood production by Forest Survey Unit, species group, and type of product, South Dakota, 1993 1/

ALL UNITS

Species group	Saw logs		Other products	All products
	MBF 2/	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS				
Redcedar	20	4	--	4
Spruce	344	66	--	66
Ponderosa pine	77,959	12,707	831	13,539
Total	78,323	12,777	831	13,609
HARDWOODS				
Ash	14	2	--	2
Cottonwood	1,020	180	--	180
Elm	32	6	--	6
Total	1,066	188	--	188
All species	79,389	12,965	831	13,796

EASTERN UNIT

Species group	Saw logs		Other products	All products
	MBF 2/	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS				
Redcedar	20	4	--	4
Spruce	20	4	--	4
Ponderosa pine	75	12	--	12
Total	115	20	--	20
HARDWOODS				
Ash	14	2	--	2
Cottonwood	1,020	180	--	180
Elm	32	6	--	6
Total	1,066	188	--	188
All species	1,181	207	--	207

WESTERN UNIT

Species group	Saw logs		Other products	All products
	MBF 2/	MCF 3/	MCF 3/	MCF 3/
SOFTWOODS				
Spruce	324	62	--	62
Ponderosa pine	77,884	12,695	831	13,527
Total	78,208	12,757	831	13,589

1/ Based on factors obtained from regional utilization studies.

2/ Thousand board feet.

3/ Thousand cubic feet.

Rows and columns may not sum due to rounding.

Table 4.—Saw-log production by Forest Survey Unit, species group, and State of destination, South Dakota, 1993

(In thousand board feet) 1/

ALL UNITS

Species	Total	Nebraska	South Dakota	Wyoming
SOFTWOODS				
Redcedar	20	--	20	--
Spruce	344	--	128	216
Ponderosa pine	77,959	--	48,799	29,160
Total	78,323	--	48,947	29,376
HARDWOODS				
Ash	14	--	14	--
Cottonwood	1,020	759	261	--
Elm	32	--	32	--
Total	1,066	759	307	--
All species	79,389	759	49,254	29,376

EASTERN UNIT

Species	Total	Nebraska	South Dakota	Wyoming
SOFTWOODS				
Redcedar	20	--	20	--
Spruce	20	--	20	--
Ponderosa pine	75	--	75	--
Total	115	--	115	--
HARDWOODS				
Ash	14	--	14	--
Cottonwood	1,020	759	261	--
Elm	32	--	32	--
Total	1,066	759	307	--
All species	1,181	759	422	--

WESTERN UNIT

Species	Total	Nebraska	South Dakota	Wyoming
SOFTWOODS				
Spruce	324	--	108	216
Ponderosa pine	77,884	--	48,724	29,160
Total	78,208	--	48,832	29,376

1/ International 1/4-inch rule.

Rows and columns may not sum due to rounding.

Table 5.—Saw-log production by Forest Survey Unit, county, and species group, South Dakota, 1993

(In thousand board feet) 1/

Unit and county	Red-cedar	Spruce	Ponde-rosa pine	Total soft-woods	Ash	Cotton-wood	Elm	Total hard-woods	All species
EASTERN UNIT									
Bennett	--	--	32	32	--	--	11	11	43
Brookings	--	--	--	--	1	6	--	7	7
Clay	4	4	2	10	--	400	--	400	410
Deuel	--	--	--	--	1	6	--	7	7
Hanson	--	--	--	--	--	25	--	25	25
Hutchinson	--	--	--	--	--	25	--	25	25
Lincoln	4	4	2	10	--	30	--	30	40
Mellette	--	--	--	--	11	--	11	22	22
Minnehaha	4	4	2	10	--	30	--	30	40
Todd	--	--	32	32	--	--	11	11	43
Union	4	4	2	10	--	30	--	30	40
Yankton	4	4	2	10	--	469	--	469	479
Total	20	20	75	115	14	1,020	32	1,066	1,181
WESTERN UNIT									
Custer	--	--	32,341	32,341	--	--	--	--	32,341
Fall River	--	--	54	54	--	--	--	--	54
Lawrence	--	162	27,165	27,327	--	--	--	--	27,327
Meade	--	--	8,181	8,181	--	--	--	--	8,181
Pennington	--	162	10,144	10,306	--	--	--	--	10,306
Total	--	324	77,884	78,208	--	--	--	--	78,208
State total	20	344	77,959	78,323	14	1,020	32	1,066	79,389

1/ International 1/4-inch rule.

Rows and columns may not sum due to rounding.

Table 6.—Saw-log receipts by Forest Survey Unit, species group, and State of origin, South Dakota, 1993

(In thousand board feet) 1/

Species group	Total	Iowa	Nebraska	South Dakota	Wyoming	Other U.S.
SOFTWOODS						
Redcedar	20	--	--	20	--	--
Spruce	128	--	--	128	--	--
Ponderosa pine	81,037	--	10,800	48,799	17,118	4,320
Total	81,185	--	10,800	48,947	17,118	4,320
HARDWOODS						
Ash	14	--	--	14	--	--
Cottonwood	386	75	50	261	--	--
Elm	32	--	--	32	--	--
Total	432	75	50	307	--	--
All species	81,617	75	10,850	49,254	17,118	4,320
			EASTERN UNIT			
SOFTWOODS						
Redcedar	20	--	--	20	--	--
Spruce	20	--	--	20	--	--
Ponderosa pine	75	--	--	75	--	--
Total	115	--	--	115	--	--
HARDWOODS						
Ash	14	--	--	14	--	--
Cottonwood	386	75	50	261	--	--
Elm	32	--	--	32	--	--
Total	432	75	50	307	--	--
All species	547	75	50	422	--	--
			WESTERN UNIT			
SOFTWOODS						
Spruce	108	--	--	108	--	--
Ponderosa pine	80,962	--	10,800	48,724	17,118	4,320
Total	81,070	--	10,800	48,832	17,118	4,320

1/ International 1/4-inch rule.

Rows and columns may not sum due to rounding.

Table 7.—Timber removals for industrial roundwood by source of material and species group, South Dakota, 1993 1/

(In thousand of cubic feet)

ALL UNITS

Species group	Growing stock				Non-growing stock							Total material used for products	Harvest residue	Total material harvested
	Used for products		Logging residue		Used for products					Logging slash				
	Saw-timber	Pole-timber	(not used)	TOTAL	Limb-wood	Sap-lings	Cull trees	Dead trees	Nonforest trees	(not used)	TOTAL			
SOFTWOODS														
Redcedar	3.6	0.1	0.1	3.8	0.1	--	--	--	--	0.5	0.6	3.8	0.6	4.4
Spruce	61.4	2.1	1.9	65.4	2.5	--	--	--	--	8.1	10.7	66.1	10.0	76.1
Ponderosa pine	12,582.0	678.4	1,018.0	14,278.4	--	5.4	--	132.5	140.4	4,063.0	4,341.4	13,538.8	5,081.1	18,619.8
Total	12,647.0	680.6	1,020.0	14,347.6	2.7	5.4	--	132.5	140.4	4,071.6	4,352.7	13,608.7	5,091.6	18,700.3
HARDWOODS														
Ash	2.2	0.0	0.3	2.5	--	--	0.1	--	--	0.5	0.6	2.3	0.8	3.1
Cottonwood	160.8	10.4	34.3	205.4	4.8	--	3.6	--	--	61.0	69.4	179.5	95.3	274.8
Elm	5.1	0.3	1.1	6.5	0.2	--	0.1	--	--	1.9	2.2	5.7	3.0	8.7
Total	168.1	10.7	35.7	214.5	5.0	--	3.7	--	--	63.4	72.1	187.5	99.1	286.6
All species	12,815.1	691.3	1,055.7	14,562.1	7.7	5.4	3.8	132.5	140.4	4,135.1	4,424.9	13,796.2	5,190.8	18,987.0
EASTERN UNIT														
SOFTWOODS														
Redcedar	3.6	0.1	0.1	3.8	0.1	--	--	--	--	0.5	0.6	3.8	0.6	4.4
Spruce	3.6	0.1	0.1	3.8	0.1	--	--	--	--	0.5	0.6	3.8	0.6	4.4
Ponderosa pine	11.9	0.1	0.9	13.0	--	--	--	0.1	--	3.9	4.0	12.2	4.8	17.0
Total	19.1	0.4	1.2	20.6	0.3	--	--	0.1	--	4.8	5.2	19.9	6.0	25.8
HARDWOODS														
Ash	2.2	0.0	0.3	2.5	--	--	0.1	--	--	0.5	0.6	2.3	0.8	3.1
Cottonwood	160.8	10.4	34.3	205.4	4.8	--	3.6	--	--	61.0	69.4	179.5	95.3	274.8
Elm	5.1	0.3	1.1	6.5	0.2	--	0.1	--	--	1.9	2.2	5.7	3.0	8.7
Total	168.1	10.7	35.7	214.5	5.0	--	3.7	--	--	63.4	72.1	187.5	99.1	286.6
All species	187.2	11.1	36.8	235.1	5.3	--	3.7	0.1	--	68.3	77.4	207.4	105.1	312.5
WESTERN UNIT														
SOFTWOODS														
Spruce	57.9	1.9	1.7	61.6	2.4	0.0	--	--	--	7.6	10.1	62.2	9.4	71.6
Ponderosa pine	12,570.0	678.3	1,017.1	14,265.4	--	5.4	--	132.4	140.4	4,059.2	4,337.4	13,526.6	5,076.3	18,602.8
Total	12,627.9	680.2	1,018.8	14,327.0	2.4	5.4	--	132.4	140.4	4,066.8	4,347.5	13,588.8	5,085.7	18,674.5

1/ Factors for determining the amount of wood in each category are based on regional utilization studies.

2/ Less than 100 cubic feet.

Rows and columns may not sum due to rounding.

Table 8.—Harvest residue generated by industrial roundwood harvesting by Forest Survey Unit, county, and species group, South Dakota, 1993

(In thousand cubic feet)

Unit and county	Red-cedar	Spruce	Ponde-rosa pine	Total soft-woods	Ash	Cotton-wood	Elm	Total hard-woods	All species
EASTERN UNIT									
Bennett	--	--	2	2	--	--	1	1	3
Brookings	--	--	--	--	(1/)	1	--	1	1
Clay	(1/)	(1/)	(1/)	(1/)	--	37	--	37	38
Deuel	--	--	--	--	(1/)	1	--	1	1
Hanson	--	--	--	--	--	2	--	2	2
Hutchinson	--	--	--	--	--	2	--	2	2
Lincoln	(1/)	(1/)	(1/)	(1/)	--	3	--	3	3
Mellette	--	--	--	--	1	--	1	2	2
Minnehaha	(1/)	(1/)	(1/)	(1/)	--	3	--	3	3
Todd	--	--	2	2	--	--	1	1	3
Union	(1/)	(1/)	(1/)	(1/)	--	3	--	3	3
Yankton	(1/)	(1/)	(1/)	(1/)	--	44	--	44	44
Total	1	1	5	6	1	95	3	99	105
WESTERN UNIT									
Custer	--	--	2,095	2,095	--	--	--	--	2,095
Fall River	--	--	3	3	--	--	--	--	3
Lawrence	--	5	1,763	1,768	--	--	--	--	1,768
Meade	--	--	533	533	--	--	--	--	533
Pennington	--	5	681	686	--	--	--	--	686
Total	--	9	5,076	5,086	--	--	--	--	5,086
State total	1	10	5,081	5,092	1	95	3	99	5,191

1/ Less than 500 cubic feet.

Rows and columns may not sum due to rounding.

Table 9.—Growing-stock removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, South Dakota, 1993

(In thousand cubic feet)

Unit and county	Red-cedar	Spruce	Ponde-rosa pine	Total soft-woods	Ash	Cotton-wood	Elm	Total hard-woods	All species
EASTERN UNIT									
Bennett	--	--	6	6	--	--	2	2	8
Brookings	--	--	--	--	(1/)	1	--	1	1
Clay	1	1	(1/)	2	--	81	--	81	82
Deuel	--	--	--	--	(1/)	1	--	1	1
Hanson	--	--	--	--	--	5	--	5	5
Hutchinson	--	--	--	--	--	5	--	5	5
Lincoln	1	1	(1/)	2	--	6	--	6	8
Mellette	--	--	--	--	2	--	2	4	4
Minnehaha	1	1	(1/)	2	--	6	--	6	8
Todd	--	--	6	6	--	--	2	2	8
Union	1	1	(1/)	2	--	6	--	6	8
Yankton	1	1	(1/)	2	--	94	--	94	96
Total	4	4	13	21	3	205	7	214	235
WESTERN UNIT									
Custer	--	--	5,804	5,804	--	--	--	--	5,804
Fall River	--	--	9	9	--	--	--	--	9
Lawrence	--	31	4,911	4,942	--	--	--	--	4,942
Meade	--	--	1,493	1,493	--	--	--	--	1,493
Pennington	--	31	2,048	2,079	--	--	--	--	2,079
Total	--	62	14,265	14,327	--	--	--	--	14,327
State total	4	65	14,278	14,348	3	205	7	214	14,562

1/ Less than 500 cubic feet.

Rows and columns may not sum due to rounding.

Table 10.—Sawtimber removals from timberland for industrial roundwood production by Forest Survey Unit, county, and species group, South Dakota, 1993

(In thousand board feet) 1/

Unit and county	Red-cedar	Spruce	Ponde-rosa pine	Total soft-woods	Ash	Cotton-wood	Elm	Total hard-woods	All species
EASTERN UNIT									
Bennett	--	--	32	32	--	--	11	11	43
Brookings	--	--	--	--	1	6	--	7	7
Clay	4	4	2	9	--	401	--	401	410
Deuel	--	--	--	--	1	6	--	7	7
Hanson	--	--	--	--	--	25	--	25	25
Hutchinson	--	--	--	--	--	25	--	25	25
Lincoln	4	4	2	9	--	30	--	30	39
Mellette	--	--	--	--	10	--	11	21	21
Minnehaha	4	4	2	9	--	30	--	30	39
Todd	--	--	32	32	--	--	11	11	43
Union	4	4	2	9	--	30	--	30	39
Yankton	4	4	2	9	--	470	--	470	479
Total	18	18	74	111	13	1,022	32	1,068	1,179
WESTERN UNIT									
Custer	--	--	32,345	32,345	--	--	--	--	32,345
Fall River	--	--	54	54	--	--	--	--	54
Lawrence	--	150	27,202	27,351	--	--	--	--	27,351
Meade	--	--	8,212	8,212	--	--	--	--	8,212
Pennington	--	150	10,412	10,562	--	--	--	--	10,562
Total	--	299	78,225	78,525	--	--	--	--	78,525
State total	18	318	78,300	78,636	13	1,022	32	1,068	79,704

1/ International 1/4-inch rule.

Rows and columns may not sum due to rounding.

Table 11.—Residues produced at primary wood-using mills by type of material, type of use, and Forest Survey Unit, South Dakota, 1993

(In thousand tons, green weight)

Survey Unit and type of use	Wood residue						Bark	
	Total		Coarse 1/		Fine 2/			
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
EASTERN UNIT								
Domestic fuel	0.10	0.30	0.06	0.19	0.04	0.11	0.02	0.08
Miscellaneous 3/	0.31	0.05	0.12	0.03	0.18	0.02	0.22	0.01
Not used	0.21	0.57	0.12	0.36	0.09	0.21	0.09	0.15
Total	0.61	0.92	0.30	0.58	0.31	0.34	0.32	0.25
WESTERN UNIT								
Fiber products	125.21	--	101.54	--	23.68	--	--	--
Industrial fuel-mill	1.64	--	1.61	--	0.04	--	38.19	--
Industrial fuel-sold	0.03	--	0.01	--	0.02	--	3.29	--
Domestic fuel	2.79	--	2.50	--	0.29	--	0.52	--
Miscellaneous 3/	14.15	--	0.80	--	13.35	--	3.20	--
Not used	7.80	--	2.44	--	5.36	--	4.55	--
Total	151.62	--	108.89	--	42.73	--	49.76	--
STATE TOTAL								
Fiber products	125.21	--	101.54	--	23.68	--	--	--
Industrial fuel-mill	1.64	--	1.61	--	0.04	--	38.19	--
Industrial fuel-sold	0.03	--	0.01	--	0.02	--	3.29	--
Domestic fuel	2.88	0.30	2.56	0.19	0.32	0.11	0.54	0.08
Miscellaneous 3/	14.46	0.05	0.92	0.03	13.54	0.02	3.41	0.01
Not used	8.01	0.57	2.56	0.36	5.45	0.21	4.64	0.15
Total	152.23	0.92	109.19	0.58	43.04	0.34	50.09	0.25

1/ Suitable for chipping such as slabs, edgings, veneer cores, etc.

2/ Not suitable for chipping such as sawdust, veneer clippings, etc.

3/ Livestock bedding, mulch, small dimension, and speciality.

Rows and columns may not sum due to rounding.

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Hackett, Ronald L.; Sowers, Raymond A.
1996. **South Dakota timber industry—an assessment of timber product output and use, 1993**. Resour. Bull. NC-175. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 19 p.

Reports findings of a survey of all primary wood-using mills in South Dakota in 1993 and compares those findings with earlier surveys. Reports production and receipts of industrial roundwood by product, species, and county. Also reports the quantity, type, and disposition of wood and bark residues generated by South Dakota's primary wood-using industry.

KEY WORDS: Bark, mill, production, roundwood, residues, saw logs.

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